Aluminum Metal Matrix Composites

Advanced Refractory Technologies, Inc.
699 Hertel Ave.
Buffalo, NY 14207
Phone: (716) 875-4091

Web: www.art-inc.com
POC: D. Matthew

TACOM/TARDEC/NAC POCs:
Luis Hinojosa
AMSTA-TR-R
Phone: (810) 574-8721
hinojosl@tacom.army.mil

Donald Ostberg
AMSTA-TR-R
Phone: (810) 574-8718
ostbergd@tacom.army.mil

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Silicon Carbide whiskers (SiCw) represent the ultimate in strength and stiffness. They can be utilized in metal matrix composites (MMC), ceramic matrix composites (CMC), and polymer matrix composites (PMC), where specific property enhancements are desired. With appropriate precautions, safe handling, and good manufacturing procedures, SiCw can be safely and effectively utilized in a wide variety of high performance applications.

The incorporation of SiCw in MMCs results in improvements in wear resistance, thermal resistance, and stiffness. These properties increase the utility of metals that are traditionally known for being ductile, moderately hard, and having good tensile strength and moderate thermal resistance. SiCw have found applications in copper, magnesium and most importantly aluminum matrix composites. Published data show significant increases in strength, modulus, and hardness for SiCw reinforced metals. The addition of SiCw to aluminum can increase the elastic modulus to levels almost that of steel, while maintaining an overall density about 1/3 that of steel.

SiCw reinforced aluminum is used in automotive, aerospace, and defense applications. Advanced Refractory Technologies is partnering with the National Automotive Center to improve the Bradley Fighting Vehicle System (BFVS) track shoes. Through the use of selectively reinforced SiCw metal matrix composites, the BFVS track shoes weigh less and have a significantly increased life.

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